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Buellia, Lempholemma, and *Thelidium* species new for Turkey and Asia

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Abstract — Three lichen species – *Buellia triseptata, Lempholemma isidioides,* and *Thelidium fontigenum* – were determined as new to Turkey and Asia following a recent lichenological survey in the Burdur region (Turkey). Descriptions of the collections accompany notes on geographic distribution, substrate, chemistry, and comparisons with morphologically similar taxa.

Key words — *Ascomycota*, biodiversity, *Lichinaceae, Physciaceae, Verrucariaceae*

Introduction

Studies on the lichen biota of Turkey during the last four years have contributed many new records for the country (Aptroot & Yazici 2012; Arslan et al. 2011; Karagöz & Aslan 2012; Karagöz et al. 2011; Kinalioglu & Aptroot 2011; Osyczka et al. 2011; Vondrák et al. 2012, Yazici et al. 2012, 2011a,b, 2010a,b,c). Within our project "Lichen and Bryophyte flora of Burdur Province" we have found some lichenized fungi as new records for Turkey. Nonetheless, more research is needed in the remaining lichenologically unexplored areas of the country before we complete the lichen flora of Turkey.

Although approximately 1650 lichen taxa (including 35 taxa of *Buellia,* 7 of *Lempholemma,* and 3 of *Thelidium*) have been recorded in Turkey, only 37 lichenized fungi have thus far been reported from Burdur (Aslan & Yazici 2013, Çobanoğlu 2005, Öztürk et al. 2005, Pišút & Guttová 2008, Şenkardeşler 2009, Yazici et al. 2013). The present report on fieldwork in southwestern Turkey's Burdur region presents three new records for Turkey and Asia.

Burdur has a continental Mediterranean climate with cold snowy winters and long hot dry summers. The mean annual temperature is 15°C, and the temperature ranges from –16 °C to 39 °C. The mean annual rainfall is 468 mm, and the average humidity is 51.2 % (Akman 1999).

The Bucak and Altınyayla districts are mountainous with much forest dominated by *Abies*, *Cedrus*, *Ficus*, *Fraxinus*, *Juniperus*, *Olea*, *Pinus*, *Pistacia*, *Prunus*, *Quercus* (especially in the Altınyayla district), and *Rhus* alternating with streams, lakes, and dams, such as the Yapraklı Dam (Altınyayla district) and Karacaören Dam (Bucak district) (Baytop & Denizci 1963). Additionally, the understory flora is very abundant and the mountains are covered with much marble rock.

Materials & methods

Lichen samples were collected by K. Yazici during 28–29 June 2012. Air-dried samples were examined with a Nikon SMZ1500 stereomicroscope and a Nikon Eclipse 80i compound light microscope. The specimens were identified by consulting relevant keys (Ahti et al. 2007, Giralt et al. 2010, Giralt & Nordin 2002, Gowan & Ahti 1993, Nordin 2000, Pykälä 2010, Smith et al. 2009, Thues & Nascimbene 2008). Thin layer chromatography (TLC) analyses were performed according to Orange et al. (2001). Vouchers are stored in the Herbarium of the Biology Department, Karadeniz Technical University, Trabzon, Turkey (KTUB).

The descriptions are based on Turkish specimens; additional details are provided from appropriate literature (Ahti et al. 2007, Nash et al. 2001, Nordin 2000, Smith et al. 2009).

The species

Buellia triseptata A. Nordin Fig 1

For a full description of the species, see Bungartz et al. (2008)

Thallus crustose, white to grey-white, ≤3 cm diam, thin, ± rounded, ± verrucose and rimose-areolate, prothallus absent; apothecia numerous, crowded, aggregated or spreading, up to 0.45 mm diam., at first immersed and flat later convex, epruinose, margin distinct, later excluded; excipulum 15–55 µm thick, pale to dark brown, dark brown in outermost part; hymenium 60–70 µm tall, without oil droplets; asci 45–60 × 13–20 µm. Paraphyses tips <5.5 µm wide, apical caps distinct; ascospores 3-septate, ellipsoid, (14–)16 –19(–21) × (5.5–) 6.5 –7.5(–9) µm, rarely with longisepta dividing the middle cells, sometimes curved; without uneven wall thickenings , perispore c. 0.2 µm thick, rugulate. Pycnidia rare. Conidia c. 4–6 × 1 µm, bacilliform.

Specimen examined – **TURKEY. Burdur:** Altinyayla, exit of Çörten village, 36°59′06.50″N 29°29′06.33″E, 1114 m, on *Quercus* sp., 11.06.2013, leg. K.Yazici. (KTUB–2430).

Remarks—*Buellia triseptata* is similar to *B. triphragmioides* with yellowish thallus but develops a grayish white thallus, smaller apothecia and spores, and longer conidia. Associated species include *Candelariella aurella, Collema nigrescens*, *Lecanora dispersa*, *Melanelia subaurifera*, *Melanelixia glabra, Melanohalea exasperata. Physcia adscendens*, and *Physconia distorta*.

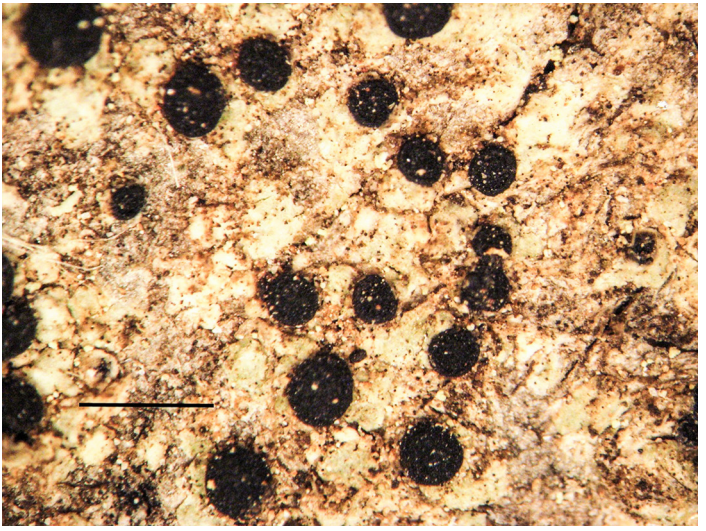

Fig. 1. *Buellia triseptata,* habitus. Scale = 1 mm

Habit & distribution—*Buellia triseptata* occurs in continental submontane to montane areas within a wide range of altitudes. The lichen grows on bark and wood (primarily on branches and twigs) of broad-leaved and coniferous trees in open situations (Burgaz et al. 2002). It prefers solitary trees in open situations or along streams or forest edges. Previously known from southwestern Europe (Spain), Morocco, and western North America.

Lempholemma isidioides (Nyl. ex Arnold) H. Magn. Fig 2

For a full description of the species, see Ahti et al. (2007)

Thallus squamulose, forming irregular rosettes, ≤2.5mm in diam., pale brown to black brown, with cylindrical isidia-like lobes, ≤0.25 mm long; squamules 0.009–0.01 mm in diam.; apothecia laminal, subimmersed, pale orange to orange, in groups of 1–4, ≤0.01 mm in diam; hymenium I + red brown; ascospores simple, colourless, ellipsoid, 10–13 × 7–8 µm. Pycnidia immersed, rare; conidia simple, bacilliform, colourless, 1–2 × 1 µm. Photobiont *Nostoc.*

Specimen examined – **TURKEY**. **Burdur:** Bucak, between Çobanpınar and Telciler villages, 37°21′04.53″N 30°46′11.09″E, 357 m, on calcareous rock, 26.06.2013. leg. K.Yazici. (KTUB–2432).

Remarks— Associated species include *Collema tenax* and *Leptogium diffractum.*

Habit & distribution—*Lempholemma isidioides* grows on irrigated sun-exposed calcareous rocks. Previously known from Europe, North America, and Scotland (Ahti et al. 2007). New to Turkey and Asia.

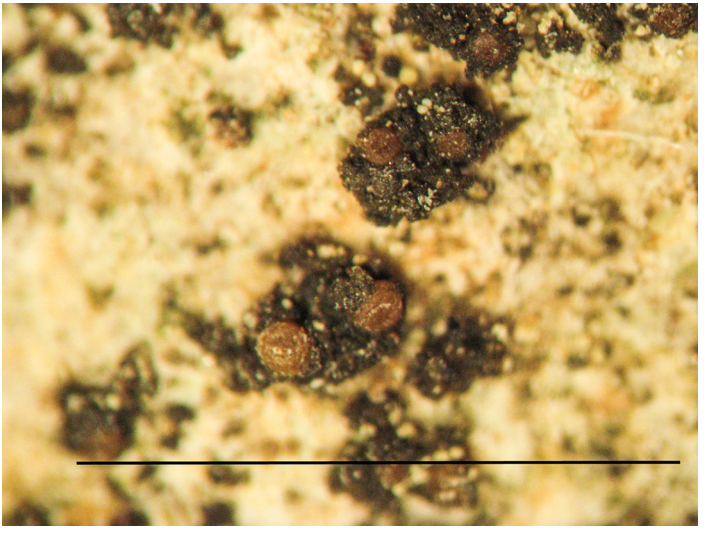

Fig. 2. *Lempholemma isidioides*, habitus. Scale = 1 mm

Thelidium fontigenum A. Massal. Fig 3

For a full description of the species, see Smith et al. (2009)

Thallus crustose, thin, yellowish, pale white to grey-white or grey, continuous, ≤4 cm in diam., often with patches of a yellow K + violet-red

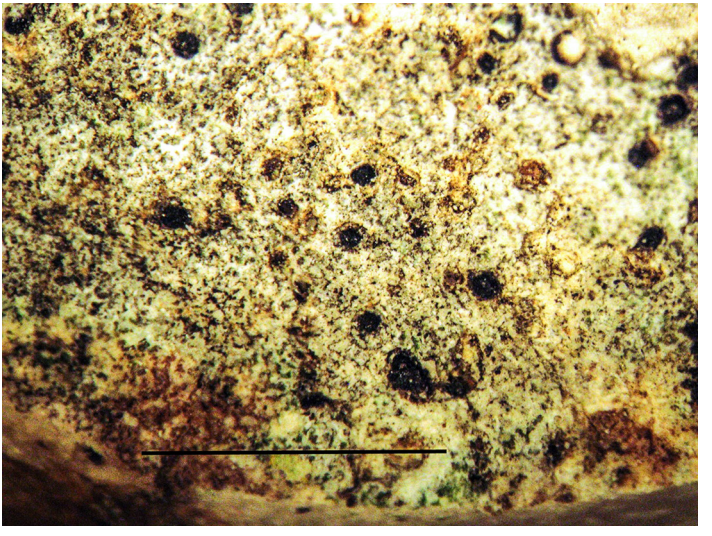

Fig. 3. *Thelidium fontigenum*, habitus. Scale = 1 mm

pigment; perithecia ≤0.20 mm diam., ± ¾ immersed in pits or in projections, 0.10–0.35 mm wide; involucrellum thin, diverging from the apex of exciple, 15–35 µm wide; ascospores 3-septate, 25–38 × 12–16 µm. Thallus (yellow areas) K + purple.

Specimen examined – **TURKEY**. **Burdur:** Bucak, Kuyubaşı village, 37°22′12.25″N 30°39′22.76″E, 990 m, on calcareous rock, 24.08.2012, leg. K.Yazici. (KTUB–2429).

Remarks—*Thelidium fontigenum* resembles *T. papulare* but develops smaller perithecia, involucrellum, and spores and has K+ red pigment patches (Orange 2013). Associated species include *Caloplaca aurantia* and *Verrucaria nigrescens*.

Habit & distribution—*Thelidium fontigenum* occurs on limestone, lime-containing sandstone, mortar, tufa, dolomite, calcareous sandstone, and silt-impregnated wood as well as mica schist and siliceous stones at varying altitudes from low mountain ranges to (sub-)alpine areas. Previously known from Europe and North America. New to Turkey and Asia.

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